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Measuring the Cost of Living

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Measuring the Cost of Living

- Inflation refers to a situation in which the economy's overall price level is rising.
- The inflation rate is the percentage change in the price level from the previous period.

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THE CONSUMER PRICE INDEX

- The *consumer price index (CPI)* is a measure of the overall cost of the goods and services bought by a typical consumer.
- The Bureau of Labor Statistics reports the CPI each month.
- It is used to monitor changes in the cost of living over time.

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THE CONSUMER PRICE INDEX

- When the CPI rises, the typical family has to spend more dollars to maintain the same standard of living.

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How the Consumer Price Index Is Calculated

- ***Fix the Basket:*** Determine what prices are most important to the typical consumer.
  - The Bureau of Labor Statistics (BLS) identifies a market basket of goods and services the typical consumer buys.
  - The BLS conducts monthly consumer surveys to set the weights for the prices of those goods and services.

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How the Consumer Price Index Is Calculated

- ***Find the Prices:*** Find the prices of each of the goods and services in the basket for each point in time.

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How the Consumer Price Index Is Calculated

- ***Compute the Basket's Cost:*** Use the data on prices to calculate the cost of the basket of goods and services at different times.

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How the Consumer Price Index Is Calculated

- ***Choose a Base Year and Compute the Index:***
  - Designate one year as the base year, making it the benchmark against which other years are compared.
  - Compute the index by dividing the price of the basket in one year by the price in the base year and multiplying by 100.

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How the Consumer Price Index Is Calculated

- ***Compute the inflation rate:*** The inflation rate is the percentage change in the price index from the preceding period.

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How the Consumer Price Index Is Calculated

- The Inflation Rate
  - The *inflation rate* is calculated as follows:

$$\text{Inflation Rate in Year 2} = \frac{\text{CPI in Year 2} - \text{CPI in Year 1}}{\text{CPI in Year 1}} \times 100$$

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Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 1: Survey Consumers to Determine a Fixed Basket of Goods

4 hot dogs, 2 hamburgers

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Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 2: Find the Price of Each Good in Each Year

Year	Price of Hot Dogs	Price of Hamburgers
2001	$1	$2
2002	2	3
2003	3	4

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Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 3: Compute the Cost of the Basket of Goods in Each Year

2001	($1 per hot dog × 4 hot dogs) + ($2 per hamburger × 2 hamburgers) = $8
2002	($2 per hot dog × 4 hot dogs) + ($3 per hamburger × 2 hamburgers) = $14
2003	($3 per hot dog × 4 hot dogs) + ($4 per hamburger × 2 hamburgers) = $20

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Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 4: Choose One Year as a Base Year (2001) and Compute the Consumer Price Index in Each Year

2001	($8/$8) × 100 = 100
2002	($14/$8) × 100 = 175
2003	($20/$8) × 100 = 250

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Table 1 Calculating the Consumer Price Index and the Inflation Rate: An Example

Step 5: Use the Consumer Price Index to Compute the Inflation Rate from Previous Year	
2002	$(175 - 100)/100 \times 100 = 75\%$
2003	$(250 - 175)/175 \times 100 = 43\%$

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How the Consumer Price Index Is Calculated

- Calculating the Consumer Price Index and the Inflation Rate: Another Example
  - Base Year is 2002.
  - Basket of goods in 2002 costs $1,200.
  - The same basket in 2004 costs $1,236.
  - CPI = ($1,236/$1,200) × 100 = 103.
  - Prices increased 3 percent between 2002 and 2004.

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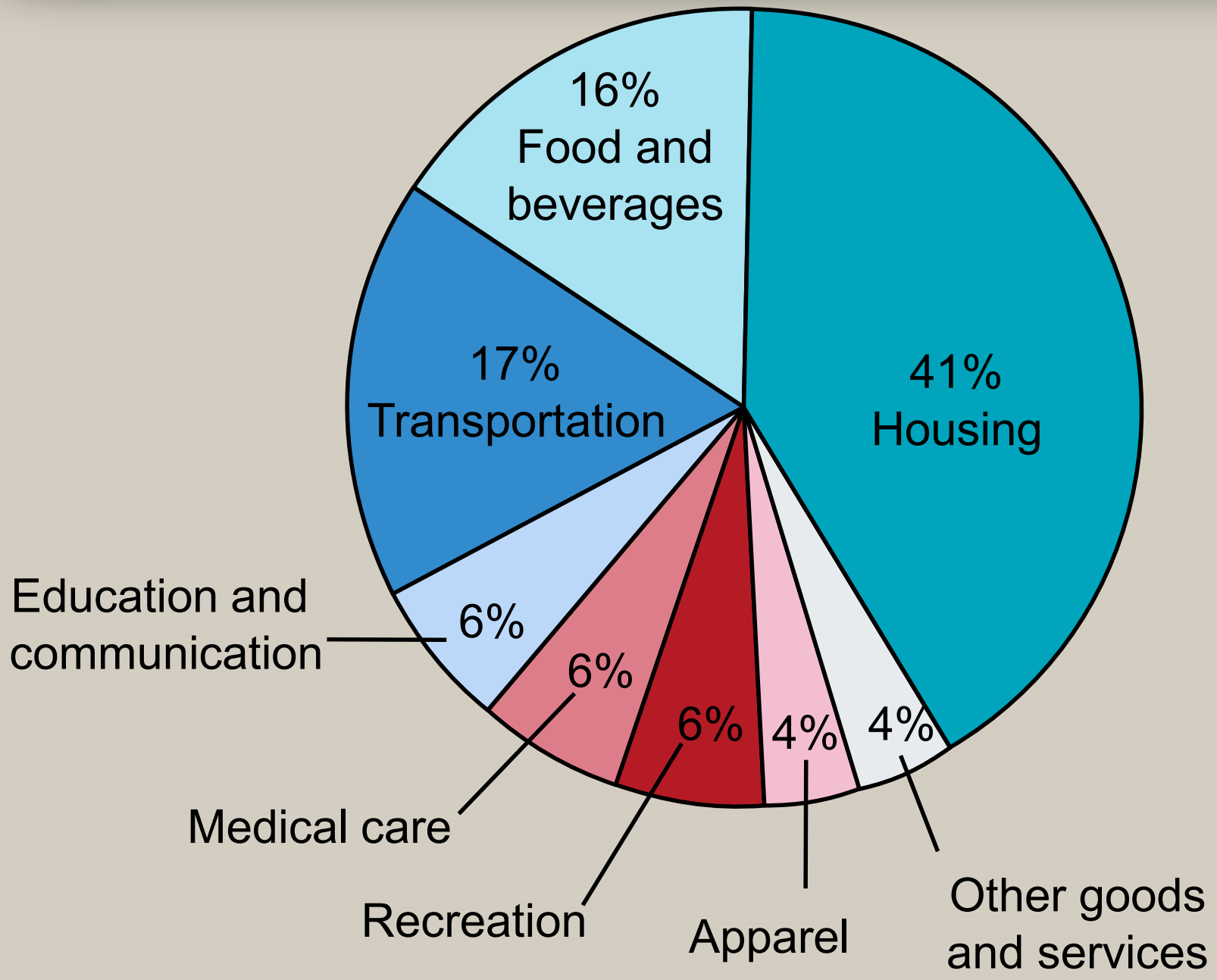
FYI: What's in the CPI's Basket?



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Problems in Measuring the Cost of Living

- The CPI is an accurate measure of the selected goods that make up the typical bundle, but it is not a perfect measure of the cost of living.

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Problems in Measuring the Cost of Living

- Substitution bias
- Introduction of new goods
- Unmeasured quality changes

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Problems in Measuring the Cost of Living

- Substitution Bias
  - The basket does not change to reflect consumer reaction to changes in relative prices.
    - Consumers substitute toward goods that have become relatively less expensive.
    - The index overstates the increase in cost of living by not considering consumer substitution.

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Problems in Measuring the Cost of Living

- Introduction of New Goods
  - The basket does not reflect the change in purchasing power brought on by the introduction of new products.
    - New products result in greater variety, which in turn makes each dollar more valuable.
    - Consumers need fewer dollars to maintain any given standard of living.

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Problems in Measuring the Cost of Living

- Unmeasured Quality Changes
  - If the quality of a good rises from one year to the next, the value of a dollar rises, even if the price of the good stays the same.
  - If the quality of a good falls from one year to the next, the value of a dollar falls, even if the price of the good stays the same.
  - The BLS tries to adjust the price for constant quality, but such differences are hard to measure.

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Problems in Measuring the Cost of Living

- The substitution bias, introduction of new goods, and unmeasured quality changes cause the CPI to overstate the true cost of living.
  - The issue is important because many government programs use the CPI to adjust for changes in the overall level of prices.
  - The CPI overstates inflation by about 1 percentage point per year.

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The GDP Deflator versus the Consumer Price Index

- The GDP deflator is calculated as follows:

$$\text{GDP deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

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The GDP Deflator versus the Consumer Price Index

- The BLS calculates other prices indexes:
  - The index for different regions within the country.
  - The *producer price index*, which measures the cost of a basket of goods and services bought by firms rather than consumers.

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The GDP Deflator versus the Consumer Price Index

- Economists and policymakers monitor both the GDP deflator and the consumer price index to gauge how quickly prices are rising.
- There are two important differences between the indexes that can cause them to diverge.

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The GDP Deflator versus the Consumer Price Index

- The *GDP deflator* reflects the prices of all goods and services *produced domestically*, whereas...
- …the *consumer price index* reflects the prices of all goods and services *bought by consumers*.

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The GDP Deflator versus the Consumer Price Index

- The *consumer price index* compares the price of a *fixed basket* of goods and services to the price of the basket in the base year (only occasionally does the BLS change the basket)...
- …whereas the *GDP deflator* compares the price of *currently produced* goods and services to the price of the same goods and services in the base year.

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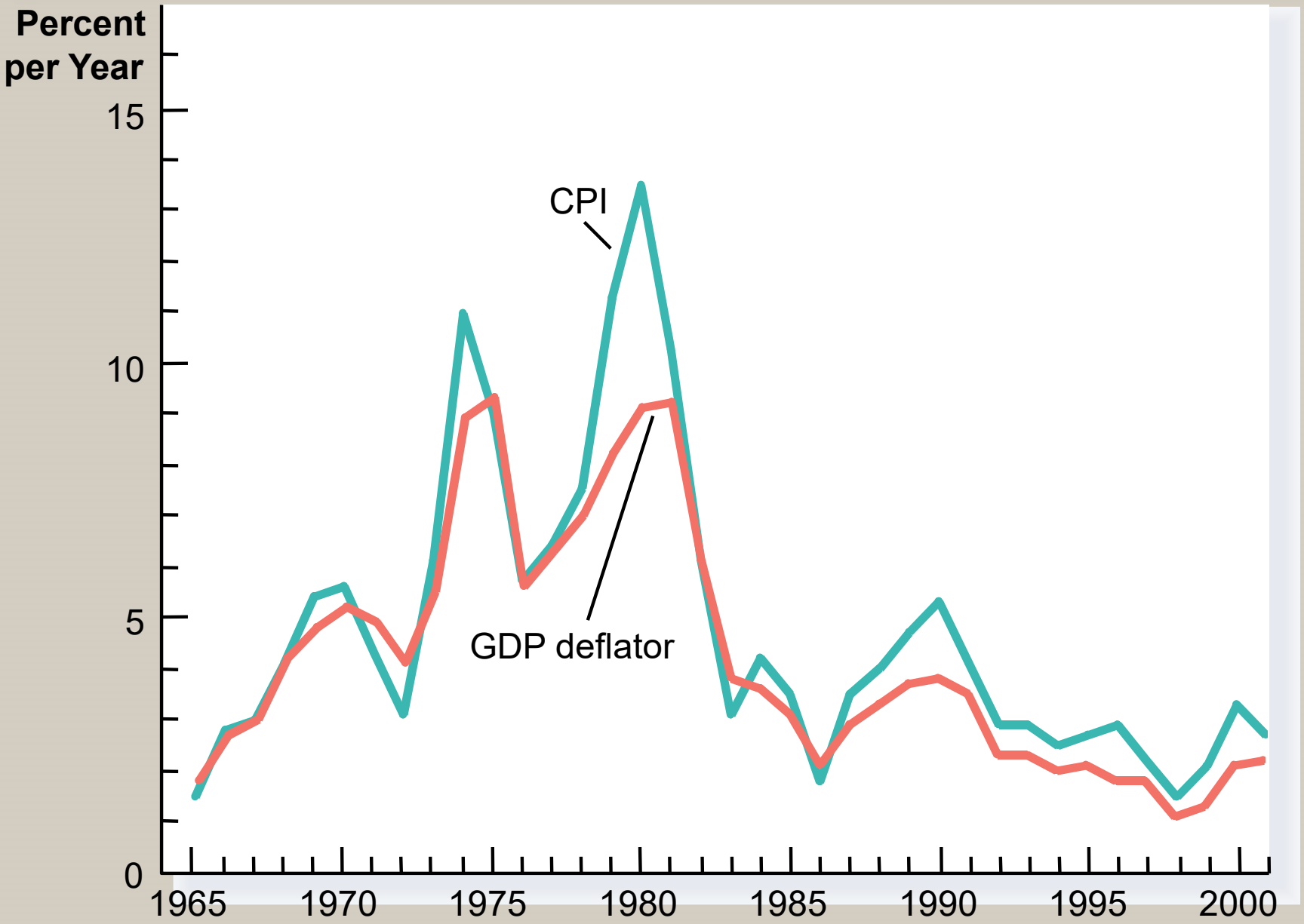
Figure 2 Two Measures of Inflation



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CORRECTING ECONOMIC VARIABLES FOR THE EFFECTS OF INFLATION

- Price indexes are used to correct for the effects of inflation when comparing dollar figures from different times.

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Dollar Figures from Different Times

- Do the following to convert (inflate) Babe Ruth's wages in 1931 to dollars in 2001:

$$\text{Salary}_{2001} = \text{Salary}_{1931} \times \frac{\text{Price level in 2001}}{\text{Price level in 1931}}$$

$$= \$80{,}000 \times \frac{177}{15.2}$$

$$= \$931{,}579$$

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Table 2 The Most Popular Movies of All Times, Inflation Adjusted

Film	Year of Release	Total Domestic Gross (in millions of 2001 dollars)
1. *Gone with the Wind*	1939	$1,002
2. *Star Wars*	1977	866
3. *The Sound of Music*	1965	695
4. *E.T.: The Extra-Terrestrial*	1982	687
5. *Titanic*	1997	640
6. *The Ten Commandments*	1956	639
7. *Jaws*	1975	625
8. *Doctor Zhivago*	1965	591
9. *The Jungle Book*	1967	519
10. *Snow White and the Seven Dwarfs*	1937	518

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Indexation

- When some dollar amount is automatically corrected for inflation by law or contract, the amount is said to be *indexed* for inflation.

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Real and Nominal Interest Rates

- Interest represents a payment in the future for a transfer of money in the past.

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Real and Nominal Interest Rates

- The *nominal interest* rate is the interest rate usually reported and not corrected for inflation.
  - It is the interest rate that a bank pays.
- The *real interest rate* is the nominal interest rate that is corrected for the effects of inflation.

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Real and Nominal Interest Rates

- You borrowed $1,000 for one year.
- Nominal interest rate was 15%.
- During the year inflation was 10%.

$$\textit{Real interest rate} = \textit{Nominal interest rate} - \textit{Inflation}$$

$$= 15\% - 10\% = 5\%$$

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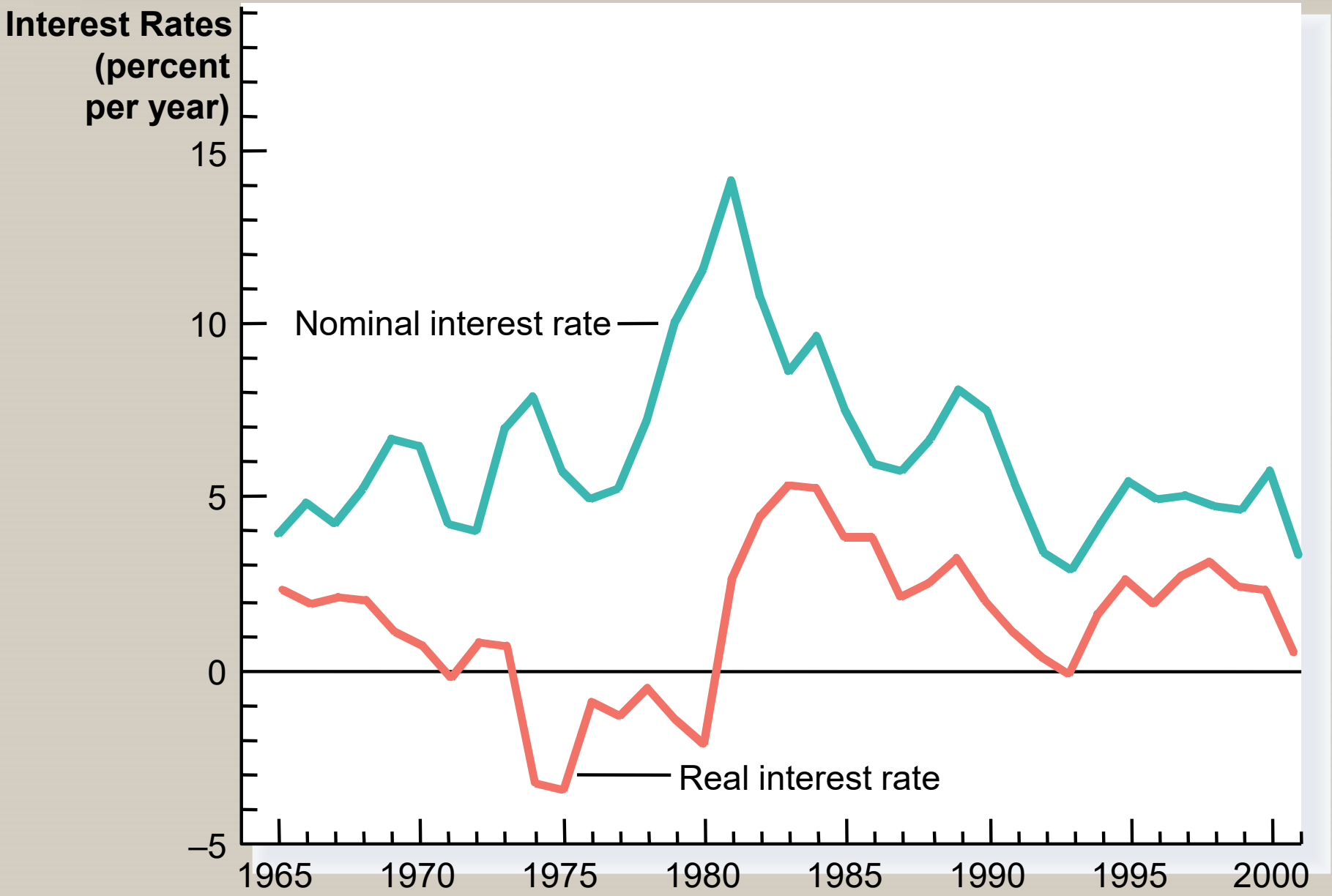
Figure 3 Real and Nominal Interest Rates



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Summary

- The consumer price index shows the cost of a basket of goods and services relative to the cost of the same basket in the base year.
- The index is used to measure the overall level of prices in the economy.
- The percentage change in the CPI measures the inflation rate.

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Summary

- The consumer price index is an imperfect measure of the cost of living for the following three reasons: substitution bias, the introduction of new goods, and unmeasured changes in quality.
- Because of measurement problems, the CPI overstates annual inflation by about 1 percentage point.

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Summary

- The GDP deflator differs from the CPI because it includes goods and services produced rather than goods and services consumed.
- In addition, the CPI uses a fixed basket of goods, while the GDP deflator automatically changes the group of goods and services over time as the composition of GDP changes.

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Summary

- Dollar figures from different points in time do not represent a valid comparison of purchasing power.
- Various laws and private contracts use price indexes to correct for the effects of inflation.
- The real interest rate equals the nominal interest rate minus the rate of inflation.

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